



Armed Forces College of Medicine AFCM



Digestion and absorption along the GIT 2

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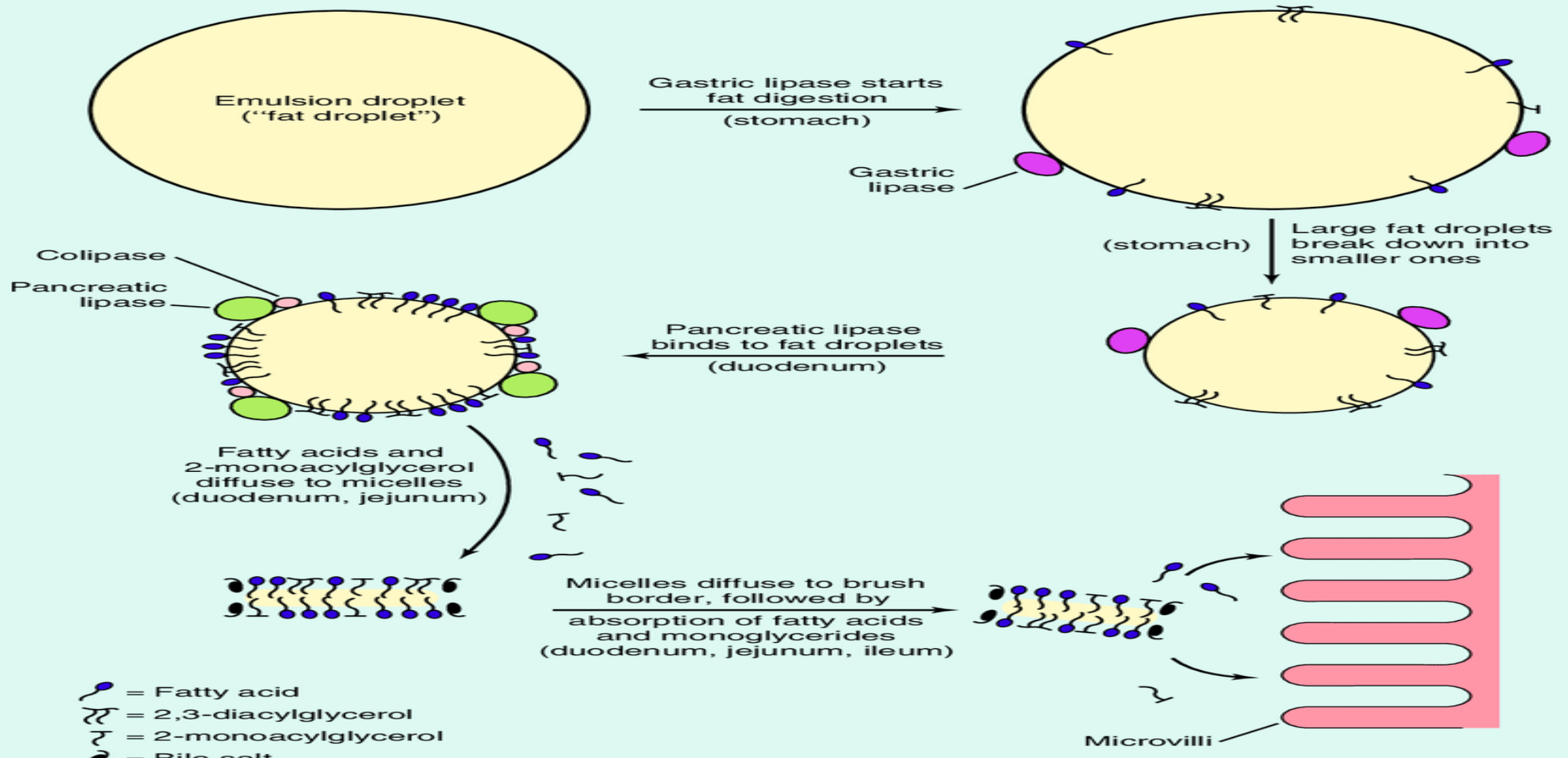
INTENDED LEARNING OBJECTIVES (ILO)



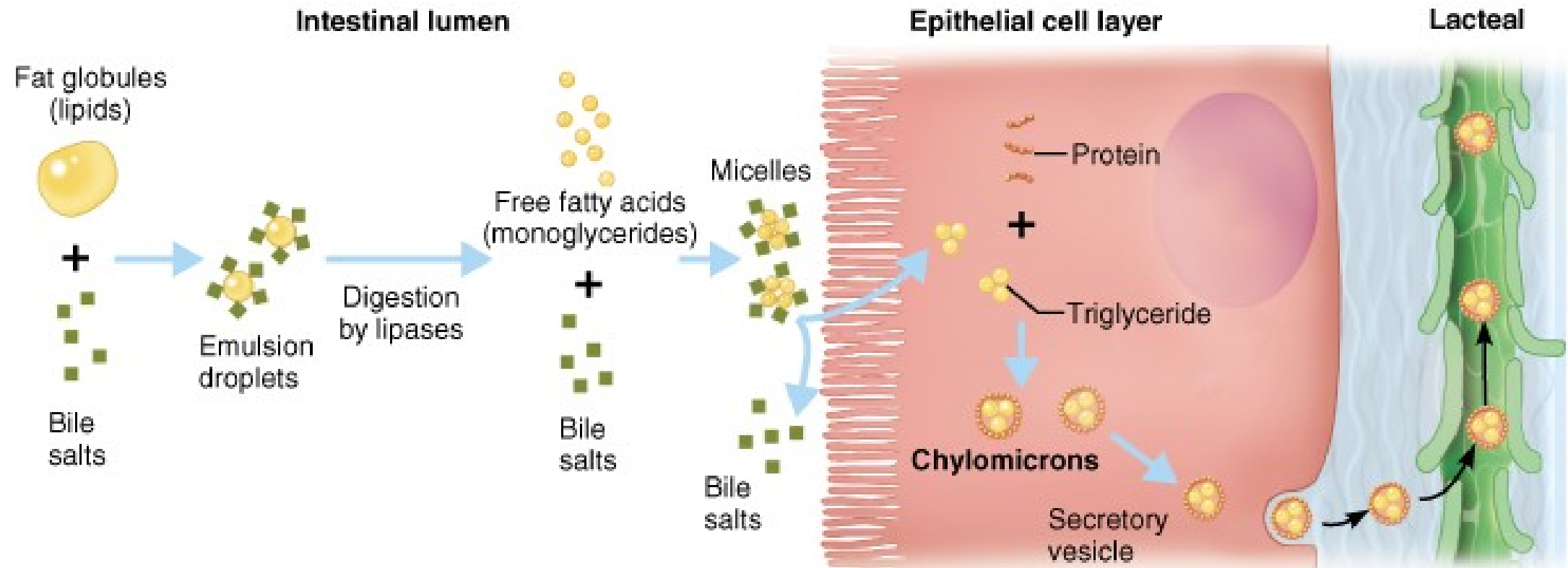
By the end of this lecture the student will be able to:

- 1. Summarize the digestion and mechanism of absorption of different nutrients (fate, minerals, vitamins) along GIT (transport carriers)**
- 2. Explain the Factors affecting intestinal absorption**
- 3. Summarize the daily water turnover (mL) in the gastrointestinal tract**
- 4. Apply knowledge to solve clinical problem**

Digestion of fat



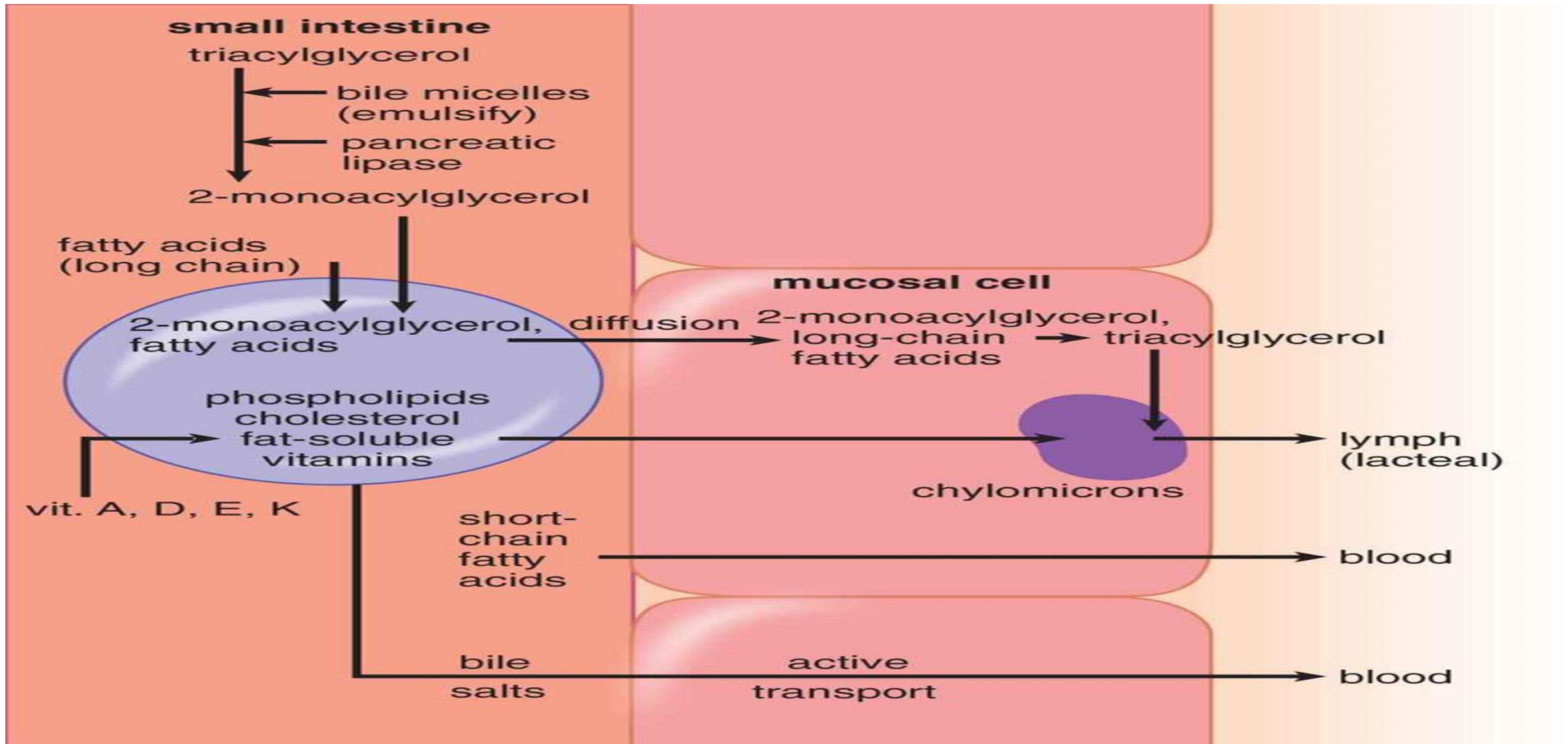
Digestion of fat



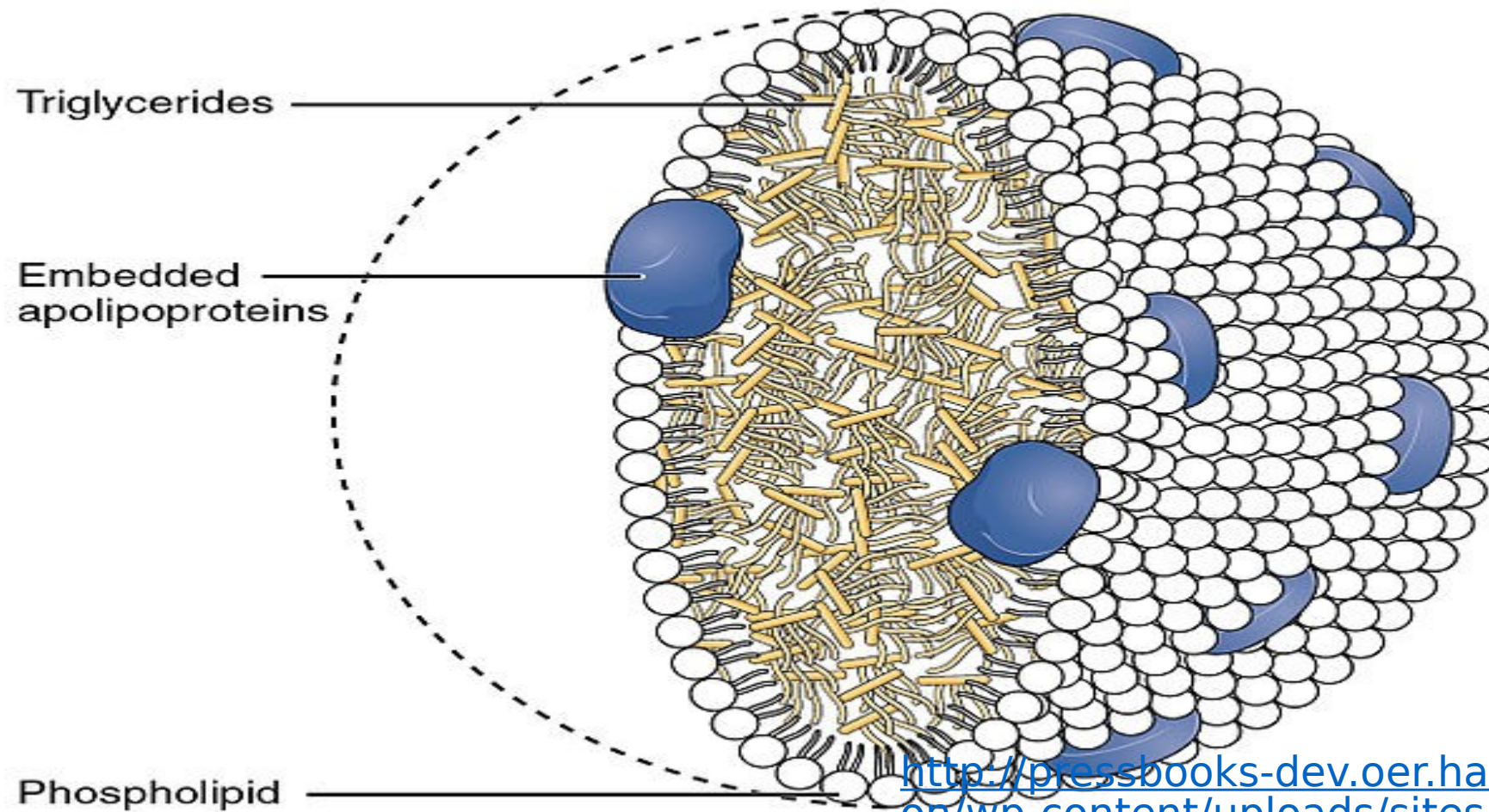
QTOTK

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Fat absorption

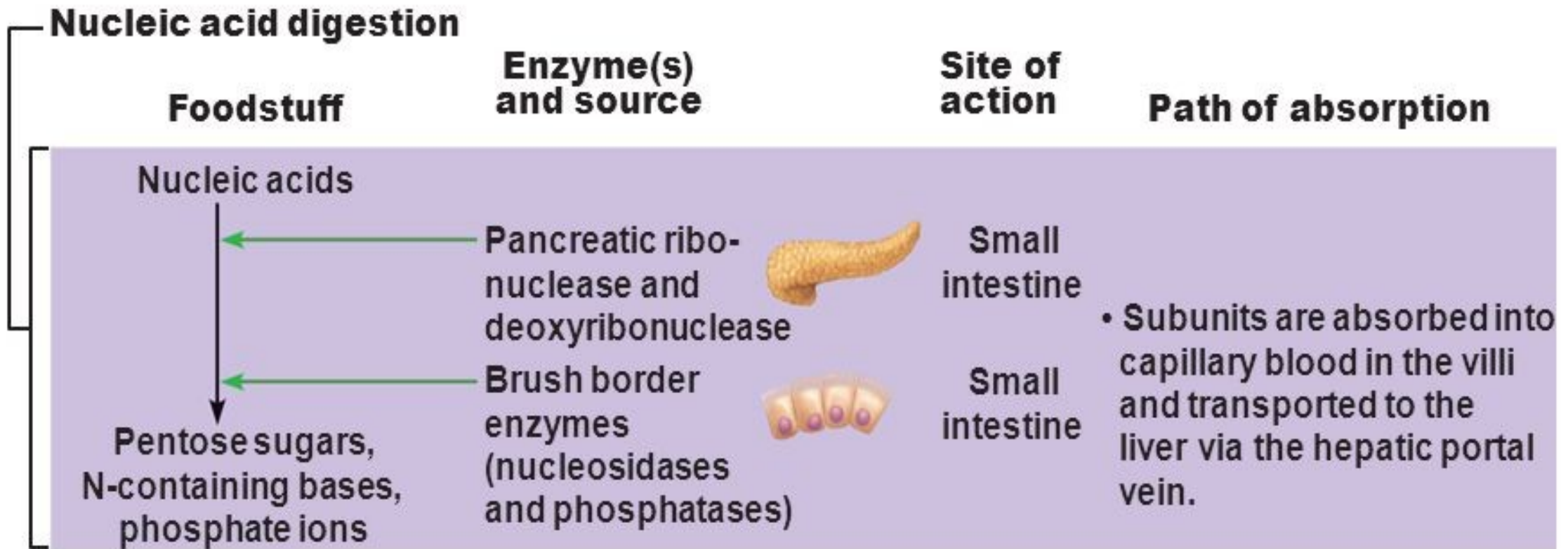


Chylomicrones



<http://pressbooks-dev.oer.hawaii.edu/humannutrition/wp-content/uploads/sites/10/2017/12/image11.png>

Digestion and absorption of nucleic acid



de_1

Draw a diagram showing digestion and absorption of a piece of meat ?

How many substances you are going to discuss??

Absorption of ions and minerals



Water “ osmotic pressure”

Minerals “All along small intestine”

Sodium “Na⁺” : actively &...??.... “sodium cotransport”

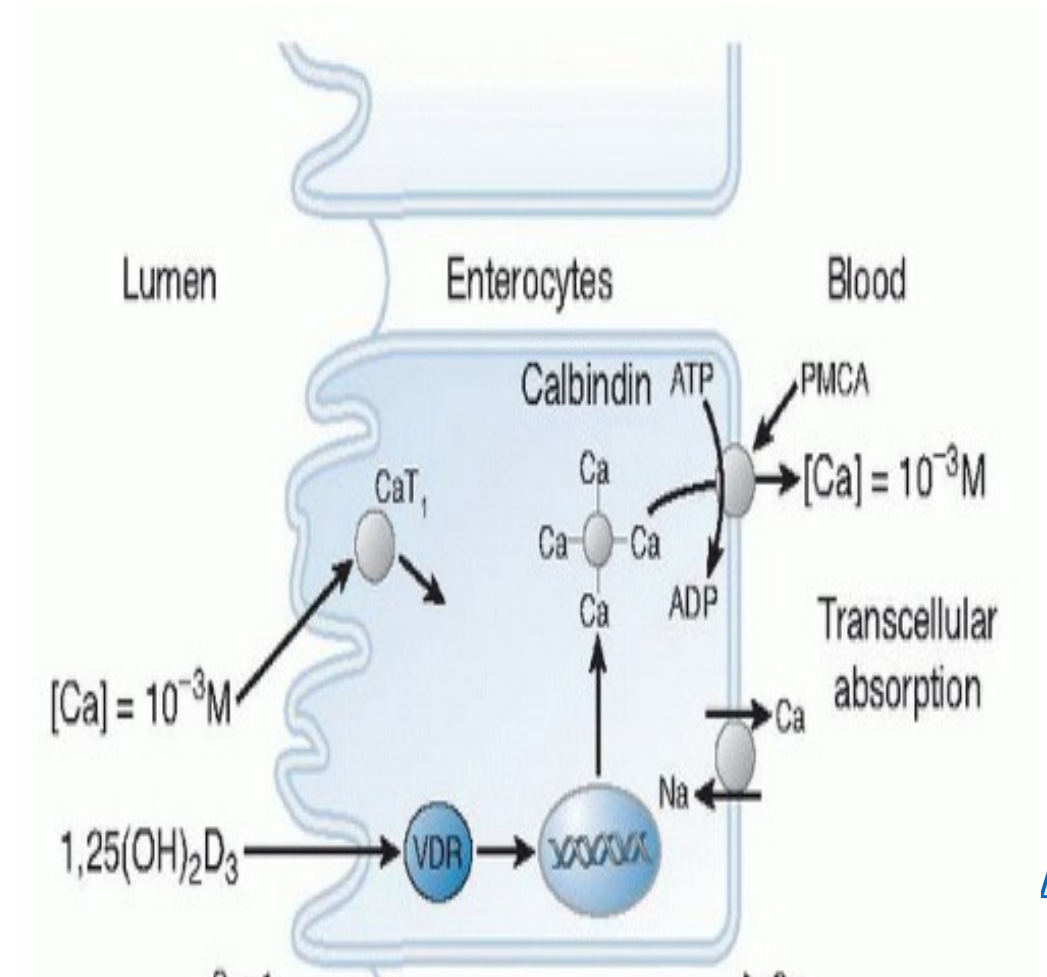
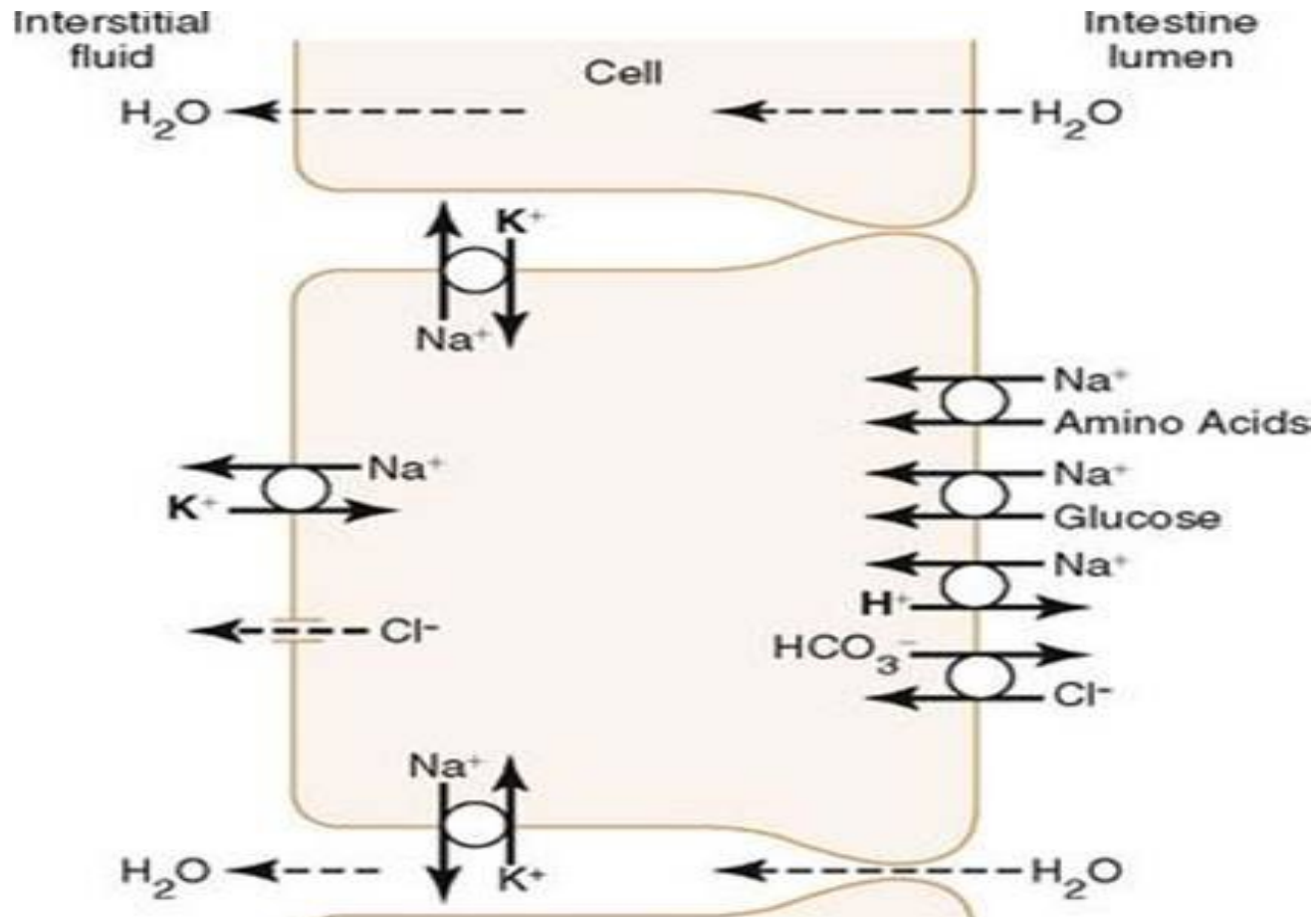
Chloride ion “cl⁻” : actively “In ileum”

Calcium “Ca⁺⁺” : actively “mostly in upper part of small intestine”

Potassium K⁺ Mostly by simple diffusion & Little by active.....

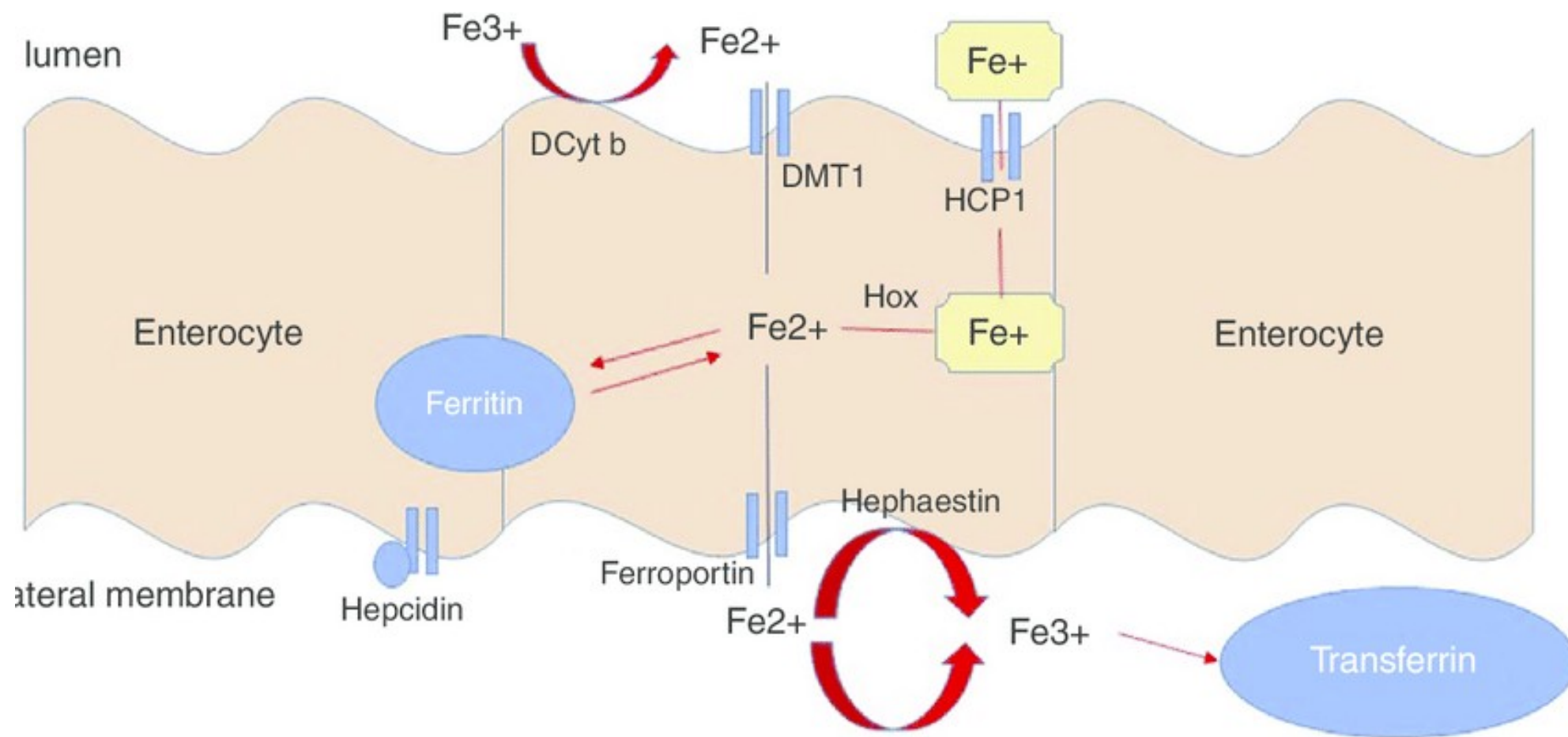
Iron “Almost in the duodenum” ?? DMT1

Absorption of Na^+

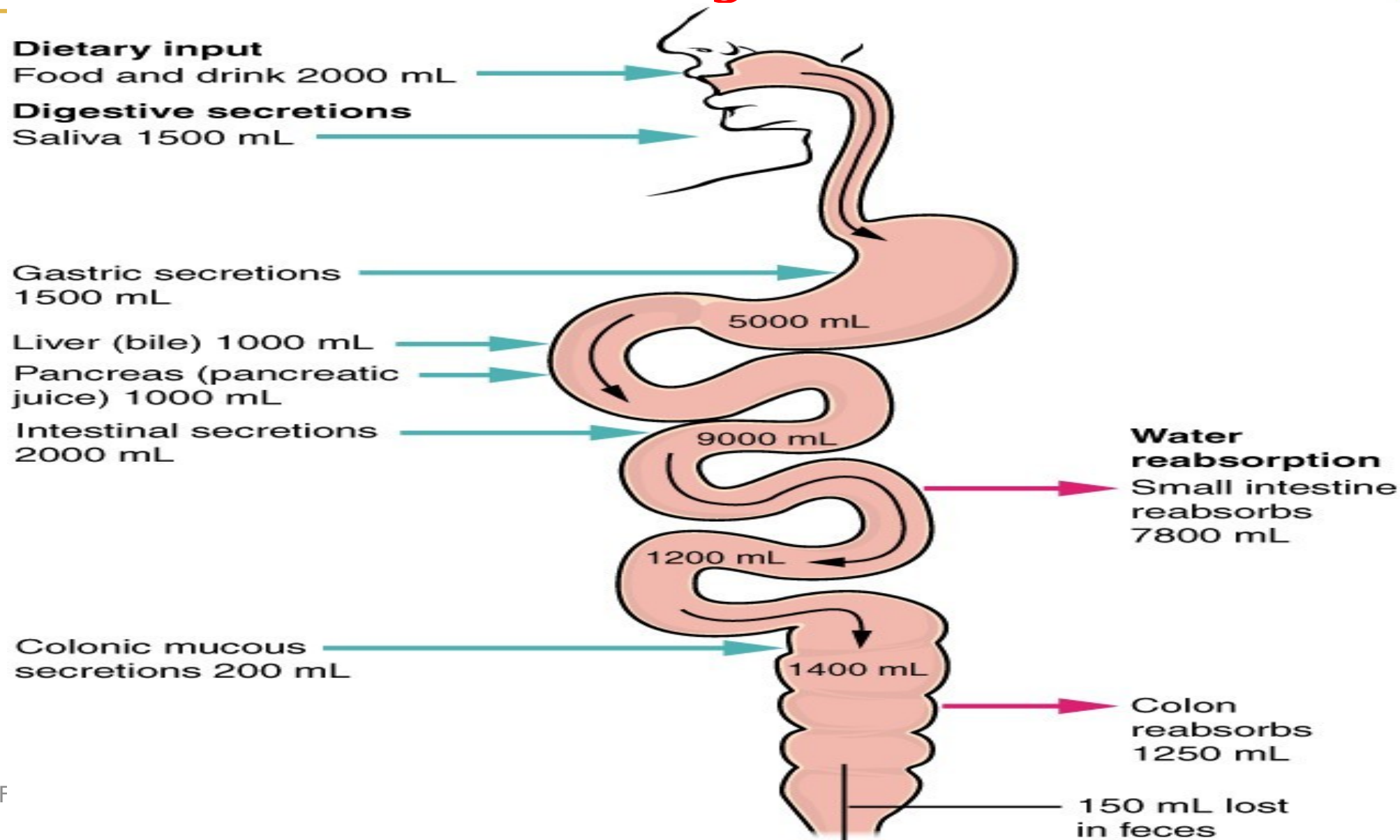


[ysiology.files/image992.jpg](https://www.ysiology.files/image992.jpg)

Absorption of Iron



Water turnover in the gastrointestinal tract



Daily water turnover (mL) in the gastrointestinal tract

INPUT OF WATER IN THE GIT

<i>Ingested water</i>	2000 ml
<i>Endogenous secretions</i>	7000
Salivary glands	1500
Stomach	2500
Bile	500
Pancreas	1500
Intestine	+1000
	7000
Total input	<i>9000</i>
<i>Reabsorbed</i>	<i>8800</i>
Jejunum	5500
Ileum	2000
Colon	+1300
Total	8800
<i>Balance in stool</i>	<i>200</i>

Absorption of vitamins



Vitamins
“unchanged”

Most “in upper part
of small intestine”

Vitamin B12 “in
ileum”

Vitamin B 12 &
folate absorption
are Na^+ -
independent

The remaining
water-soluble
vitamins need
carriers
“ Na^+ +
cotransporters”

Water soluble
vitamins faster than
fat soluble vitamins

Factors affecting intestinal absorption



1) Vitality of intestinal mucosa

2) State of digestion

3) Bile salts & lymph flow

4) Duration of contact of food to intestinal mucosa

5) Intestinal mixing movements

6) Surface area available for absorption

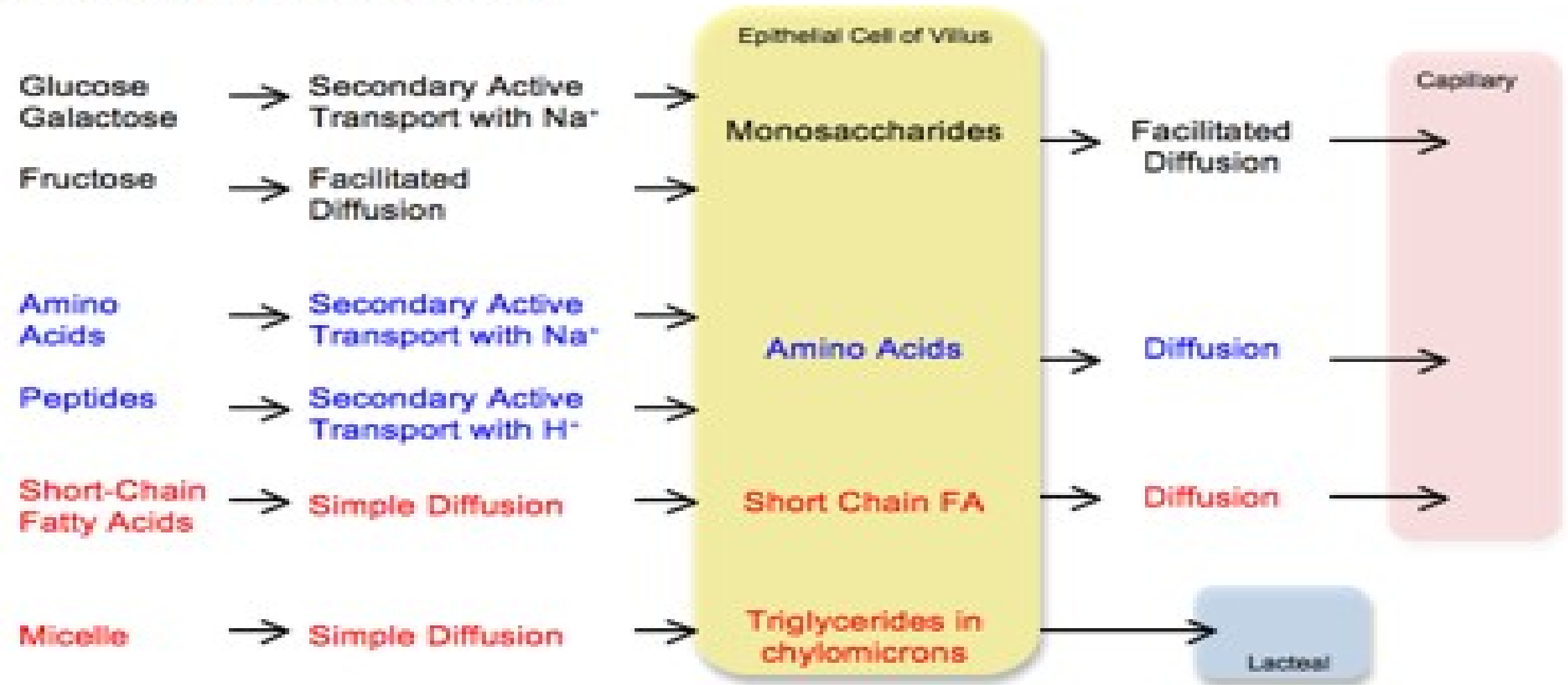
7) Movements of the villi

8) Physico-chemical factors:-

Summary



Absorption in the Small Intestine



Lecture Quiz



1) Water is absorbed in the jejunum, ileum, colon and excreted in feces. Arrange these in order of the amount of water; absorbed or excreted, from the greatest to the smallest.

- a) Colon, jejunum, ileum, feces.
- b) Feces, colon, ileum, jejunum.
- c) Jejunum, ileum, colon, feces.
- d) Colon, ileum, jejunum, feces.
- e) Feces, jejunum, ileum, colon.

C

2) Which deficiency in digestion or absorption is caused by a lack of bile salts?

- f) Lactose intolerance.
- g) Cystinuria.
- h) Secretory diarrhea.
- i) Deficiency in intestinal micelle formation.
- j) Lack of triglyceride breakdown.

d

SUGGESTED TEXTBOOKS



- 1) Ganong's "Review of Medical Physiology".**
- 2) Guyton and Hall "Textbook of Medical Physiology".**